AGGREGATION/DISAGGREGATION OF POPULATIONS

Classification of populations into rural or non-rural categories involves decisions about the aggregation and disaggregation of people into case populations. There are two separate aggregation/disaggregation steps involved in our methodologies. In the first aggregation/disaggregation step, populations are identified for the purpose of data collection, data compilation, and measurement of rural/non-rural factors. After this step, the cases are assessed using the information, resulting in a classification of each case population into a "rural" or "non-rural" category. In the second aggregation/disaggregation step, individually-classified case populations are geographically combined into larger contiguous rural or non-rural areas. This aggregation/disaggregation step results in the identification of consolidated boundaries of rural and non-rural groups. Each of these aggregation/disaggregation steps is discussed in this section with the methods used in our analysis.

Identifying Populations and Measuring Variables

In the approach we are taking, the basic unit of analysis is a "population." A *population* is defined as *a set of people identified by geographic* or *community boundaries*. Any identifiable population may be legitimately assessed for "rural" or "non-rural" classification under our system, subject to availability of information. A *geographic area* is a bounded space, described as lines connecting a series of geographic coordinates, and visually represented as a closed polygon on a map. A *community* is a named human population forming a distinct segment of society by virtue of a common government, common interests, a pattern of sharing, participation, fellowship, or other factors (American Heritage Dictionary of the English Language, 4th Edition 2000: 374). Community boundaries commonly are defined by governmental jurisdictions, such municipal borders or local tribal membership roles. Communities also may be indicated by measures of economic or social integration, such as commuting patterns for work. For our purposes, a *society* is a group of people broadly distinguished from other groups by mutual interests, participation in characteristic relationships, shared institutions, and a common culture (AHDEL 2000: 1650). *Culture* may be defined as the socially-transmitted behavior patterns, arts, beliefs, institutions, and other products of human work and thought shared within a particular period, class, community, or population (AHDEL 2000: 442).

Population is a flexible concept. Innumerable populations are potentially definable in Alaska. As stated above, the general rule of aggregation/disaggregation for initial assessment is that any identifiable population may be legitimately assessed for "rural" or "non-rural" designation, subject to availability of information. While this is the general rule, in the identification of initial case populations there will be constraints placed by *public acceptability*, *administrative rules*, and *data availability*.

In terms of *public acceptability*, large population aggregates likely will be unacceptable to stakeholders if perceived to hide real, meaningful differences among constituent populations. Stakeholders may object that potentially-distinguishable populations are being wrongly classified by being grouped within unreasonably large or arbitrary population aggregates. In this event, there are likely to be requests for disaggregation and reassessment with smaller or reconfigured groupings. As discussed in our literature review, entire boroughs in Alaska are classified as "rural" or "non-rural" for federal health programs. For subsistence management, such an approach is likely to be considered too broad-brushed by public stakeholders, because it ignores potentially significant differences between constituent populations within Alaska's boroughs. Public acceptability requires assessed population units to be smaller.

Administrative rules may establish limits to disaggregation. Both state and federal regulations refer to *community* and *area* in their procedures for determining areas and groups eligible for subsistence. Under federal subsistence regulations, "The Board shall determine if an *area* or *community* in Alaska is rural" (50 CFR 100.___ and 36 CFR 242.___ , §____.15). Under State subsistence regulations, "A nonsubsistence area is an *area* or *community* where dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area or community" (AS 16.05.258(c)). In applying these procedural rules, federal and state boards have considered *communities* or *areas* as starting points for assessment. This means individual households generally have not been considered as legitimate units for rural/non-rural determinations. Households have been considered as part of some larger *community* or *area*. When geographically distinct, relatively small groups of surveyed households have been treated as communities or areas (examples include Meyers Chuck with 21 people and Petersville CDP with 27 people). Small, less distinct household groups tend to be aggregated with neighbors when assessed. Federal regulations state that "communities or areas that are economically, socially, and communally integrated shall be treated in the aggregate" (50 CFR 100.___ and 36 CFR 242.___ §15(6)). This rule allows for the aggregation of households into larger units when economic, social, or communal integration is observed.

The *availability of data* is a major third constraint on the identification of populations. If data have not been collected for a particular population, it is difficult to assess it as an individual case. If one is to use federal census information and ADF&G information in rural/non-rural methodologies (as was required in this study), populations are constrained by the units for which the data were gathered. As stated in the literature review, the U.S. Census Bureau collects information from households clustered by census block, and makes the information available in increasingly larger hierarchically-arranged groups (block group, tracts, census designated places/municipalities, metropolitan/nonmetropolitan areas, counties/boroughs, and so forth). It is difficult to assess populations that cross-cut census blocks, if census information is to be used.

ADF&G's harvest information is collected at several different levels. In the Community Profile Database (CPDB), measurements are at the level of *community*, which refers to a systematically-sampled set of households representing a population, as defined above. To disaggregate to smaller population units, one must assume that mean values of

measured variables are equivalent for each of the smaller units. To aggregate communities, one must arithmetically compute new averages for the higher-order populations. In the Division of Wildlife Conservation harvest ticket/permit record databases, measurements are for individuals linked to a mailing address (ZIP code) or community of residence (a named place). These potentially can be aggregated to case populations through a set of rules linking ZIP codes or named places to the case populations. In the Division of Sport Fish database on sport and personal use harvests, information is collected by a mailed survey of a sample of households with license holders. This information is potentially linked to ZIP code and community of residence, like the harvest ticket/permit record data sets. In the Alaska Subsistence Fisheries Database (ASFDB), information on net-caught salmon is at the level of named community. Linking the harvest databases and federal census database to a common set of populations requires a complex set of steps, which potentially constrains the size and boundaries of case populations.

In our analysis, for populations off Alaska's road system, case populations were identified by linking information at the level of *community, census designated place,* and *municipality*. For off-road areas, there usually is a fairly direct correspondence between *community* in the CPDB and *census designated place* or *municipality* in the federal census. Therefore, linking measures for these case populations from databases was fairly straightforward.

For populations along Alaska's road system, the linking of measures to populations entailed more complex procedures. Our analysis sought population groupings that provided fine resolution and valid measurement of key rural/non-rural factors (density variables and harvest variables) along road systems. Information at a relatively fine resolution would be more likely to reveal boundaries in rural-urban fringes, an issue raised in the literature review. To achieve this goal, information was linked through *census tracts*, *tract groupings*, *census designated places*, and *community of residence*. Case populations identified through this procedure are listed in the first column of Fig.11. The detailed procedural steps are provided in the final report's documentation.

As shown in the second column of Fig. 11, the 2000 federal census divided the Municipality of Anchorage (260,283 people) into 55 census tracts. Anchorage's census tracts had an average size of 4,732 people, with a range of 1,458 people (anc1100, in the downtown area) to 9,165 people (anc0203, a tract in the Eagle River vicinity) (see Fig. 8). Tracts were used for measuring density. For measuring country food harvests, the finest resolution achieved with ADF&G databases was 27 populations, representing merged census tracts sharing common ZIP codes (the first column in Fig. 11). We named each of these merged tracts after a feature in its area. The density for each merged tract group was estimated taking the mean of the constituent tract densities.

Fig. 11. Selected Case Populations and Components (Tracts or CDPs), with Population, Density, and Harvest Estimates

CASE POPULATIONS	COMPONENTS	POP2000	DNSDUA30	PERCAP3
Municipality of Anchorage				
1 Lake Otis	anc1500	5,275	30.71	12.19
2 Russian Jack	anc0802	4,084	30.14	12.15
3 Midtown		12,687	29.82	13.61
	anc1400	5,083	29.10	13.61
	anc1900	4,181	30.19	13.61
	anc2000	3,423	30.16	13.61
4 University	anc1602	4,633	29.64	12.26
5 Merrill Field	anc0901	4,128	29.14	10.16
6 Northfork	anc1802	4,324	29.13	13.74
7 MidFork-RusJack		10,105	29.00	12.12
	anc0801	6,404	27.54	12.12
	anc1601	3,701	30.46	12.12
8 Delaney Lake	anc2400	2,917	28.73	12.99
9 Campbell Creek		9,245	28.05	15.48
	anc2501	4,926	27.65	15.48
	anc2502	4,319	28.45	15.48
10 Little Campbell Creek		23,581	27.08	15.09
	anc1801	3,919	29.95	15.09
	anc2601	3,540	28.07	15.09
	anc2602	4,734	27.56	15.09
	anc2603	5,598	25.77	15.09
	anc2811	5,790	24.03	15.09
11 Spenard		14,939	25.89	12.59
	anc1300	3,255	20.28	12.59
	anc2100	3,761	30.04	12.59
	anc2201	4,874	24.02	12.59
	anc2202	3,049	29.23	12.59
12 Downtown	anc1100	1,458	25.86	8.04
13 Muldoon		36,961	25.73	16.64
	anc0701	4,356	27.50	16.64
	anc0702	4,432	25.40	16.64
	anc0703	4,922	21.34	16.64
	anc1701	6,553	27.20	16.64
	anc1702	5,198	28.97	16.64
	anc1731	5,354	25.48	16.64
	anc1732	6,146	24.20	16.64
14 Avenue Fifteen		12,288	25.70	8.77
	anc0500	1,948	19.06	8.77
	anc0902	3,029	30.61	8.77
	anc1000	3,404	28.44	8.77
15 Ship Creek	anc0600	6,727	25.56	11.96
16 Airport		18,626	22.63	18.30
	anc2301	5,394	17.10	18.30
	anc2302	4,737	26.17	18.30
	anc2303	8,495	24.63	18.30
	anc1200	3,907	24.70	8.77
17 OMalley	anc2812	6,000	21.18	21.34
18 Lower OMalley-Cambell Lk		12,697	20.26	21.35
	anc2711	5,804	17.91	21.35
	anc2712	6,893	22.61	21.35
19 Coastal Refuge	anc2702	8,612	16.98	21.35
20 Rabbit Creek		12,318	14.69	22.64
	anc2821	4,875	18.13	22.64
	anc2822	4,020	16.01	22.64
	anc2823	3,423	9.94	22.64
21 Elmendorf	anc0400	6,626	14.17	18.01
22 Fort Richardson	anc0300	5,470	12.81	15.14
23 Upper OMalley	anc2813	4,574	12.18	22.06
24 Eagle River		20,610	10.26	27.34
	anc0201	3,060	10.96	27.34
	anc0202	5,924	11.83	27.34
	anc0203	9,165	12.07	27.34
	anc0204	2,461	6.20	27.34
25 Chugiak	anc0102	4,472	7.55	36.67
26 Eklutna	anc0101	4,835	4.57	41.97
27 Girdwood	anc2900	2,091	3.66	18.39

Fig. 11. Selected Case Populations and Components (Tracts or CDPs), with Population, Density, and Harvest Estimates (p. 2)

Fairbanks North Star Borough				
28 Central Fairbanks		16,788	9.00	17.09
	fai01	1,732	9.44	17.09
	fai02	3,379	8.88	17.09
	fai03	4,296	8.25	17.09
	fai04	4,496	7.17	17.09
	fai05	2,885	8.39	17.09
29 Southwest Fairbanks		17,574	8.18	19.31
	fai06	3,632	7.86	19.31
	fai07	4,203	7.29	19.31
	fai08	4,766	5.95	19.31
	fai09	3,512	3.36	19.31
	fai10	1,461	5.82	19.31
30 North Pole Area		16,295	7.39	27.48
	fai14	5,396	4.47	27.48
	fai15	7,152	4.46	27.48
	fai16	3,747	3.92	27.48
31 Fort Wainwright	fai11	7,381	6.56	19.09
32 Northwest Fairbanks	fai13	5,127	5.05	15.90
33 Northeast Fairbanks	fai12	4,894	4.75	33.22
34 Eielson AFB	fai18	5,400	3.41	22.59
35 North Fairbanks	fai19	8,253	2.92	10.05
36 Salcha-Harding	fai17	1,128	.73	47.38
Juneau City and Borough				
37 Juneau City and Borough		30,711	3.11	24.61
Auk Bay-Lynn Canal	jun0100	4,468	1.95	24.61
Mendenhall East	jun0200	7,445	4.78	24.61
Mendenhall West	jun0300	5,135	4.65	24.61
Lemon Creek	jun0400	4,722	2.97	24.61
Downtown-Thane	jun0500	3,644	1.68	24.61
Douglas Island	jun0600	5,297	2.65	24.61
Matanuska-Susitna Borough (Case Populations)				
38 Big Lake		2,635	1.69	19.88
95 Chickaloon CDP		213	.37	223.58
39 Glacier View CDP		249	.09	35.78
40 Houston		1,202	1.58	11.56
153 Lake Louise		88	.03	179.18
41 Palmer (group)		15,000	2.65	26.95
	Buffalo Soapstone CDP	699	1.78	26.95
	Butte CDP	2,561	2.73	26.95
	Farm Loop CDP	1,067	2.79	26.95
	Fishhook CDP	2,030	2.08	26.95
	Gateway CDP	2,952	3.59	26.95
	Lazy Mountain CDP	1,158	2.00	26.95
	Palmer CDP	4,533	3.58	26.95
43 Petersville CDP		27	.04	27.68
315 Point MacKenzie CDP		111	.35	14.97
44 Skwentna (group)		148	.04	100.85
	Skwentna CDP	111	.04	100.85
	Susitna CDP	37	.07	100.85
45 Sutton-Alpine		1,080	1.21	24.06
46 Talkeetna (group)		813	.19	55.38
	Chase CDP	41	.06	209.21
	Talkeetna CDP	772	.32	55.04
48 Trapper Creek CDP		423	.19	65.38
49 Wasilla (group)		29,618	3.44	24.10
	Knik-Fairview CDP	7,049	3.49	24.10
	Knik River CDP	582	1.75	24.10
	Lakes CDP	6,706	4.54	24.10
	Meadow Lakes CDP	4,819	3.35	24.10
	Tanaina CDP	4,993	3.63	24.10
	Wasilla CDP	5,469	3.86	24.10
50 Willow (group)		2,614	.90	23.24
	Willow CDP	1,658	1.40	23.24
	Y CDP	956	.39	23.24
Lower Order Mat-Su Borough Populations				
42 Parks Highway South		367		58.01

Fig. 11. Selected Case Populations and Components (Tracts or CDPs), with Population, Density, and Harvest Estimates (p. 3)

Kenai Peninsula Borough				
51 Anchor Point (group)		2,334	.74	55.19
	Anchor Point CDP	1,845	1.03	55.19
	Happy Valley CDP	489	.45	55.19
52 Clam Gulch		173	.51	99.48
53 Cooper Landing		369	.16	77.29
54 Fritz Creek CDP		1,603	.88	72.14
55 Halibut Cove		35	.31	29.62
57 Homer (group)		8,472	1.08	39.12
	Diamond Ridge CDP	1,802	1.29	39.12
	Fox River CDP	616	.42	39.12
	Homer CDP	3,946	1.78	66.18
	Kachemak City CDP	431	.93	39.12
	Miller Landing CDP	74	1.18	39.12
59 Hope (group)		155	.04	60.97
	Hope CDP	137	.06	60.97
	Sunrise CDP	18	.02	11.24
60 Kasilof (group)		1,639	1.02	60.46
	Cohoe CDP	1,168	1.01	60.46
	Kasilof CDP	471	1.03	60.46
62 Kenai (group)		9,828	2.35	60.07
	Kenai CDP	6,942	3.40	60.07
	Ridgeway CDP	1,932	2.18	36.54
	Salamatof CDP	954	1.46	36.54
64 Moose Pass (group)		374	.16	37.72
	Crown Point CDP	75	.14	37.72
	Moose Pass CDP	206	.16	37.72
	Primrose CDP	93	.18	37.72
165 Nanwalek		177	.19	253.93
65 Nikiski		4,327	2.14	16.83
66 Nikolaevsk		345	.55	88.55
67 Ninilchik		772	.51	134.85
189 Port Graham		171	.20	253.41
70 Seldovia (group)		430	.30	183.55
	Seldovia CDP	286	.31	183.55
	Seldovia Village CDP	144	.29	183.55
71 Seward (group)		4,670	.72	28.53
323	Bear Creek CDP	1,748	.78	28.53
334	Lowell Point CDP	92	.28	28.53
341	Seward CDP	2,830	1.11	28.53
72 Soldotna (group)		14,946	2.39	42.00
329	Funny River CDP	636	1.42	42.00
332	Kalifonsky CDP	5,846	3.04	42.00
342	Soldotna CDP	3,759	2.68	42.00
343	Sterling CDP	4,705	2.40	42.00
215 Tyonek		193	.13	259.95
Other Lower Order Kenai Borough Populations				
68 North Fork Road	Part of Nikolaevsk	467	.55	71.06
73 Voznesenka	Part of Fox River CDP (Homer Group)	327	.42	103.23
Ketchikan Gateway Borough				
76 Ketchikan		7,922	2.07	31.11
	ket0100	3,811	1.81	31.11
	ket0200	4,898	2.60	31.11
	ket0300	3,024	2.27	31.11
	ket0400	2,337	1.62	31.11
77 Saxman		431	1.62	210.54

The Fairbanks North Star Borough (82,840 people) was divided by the federal census into 19 census tracts, shown in Fig. 11. The census tracts had an average size of 4,360 people, with a range of 1,128 people (Tract Fai17) to 8,253 people (Tract Fai19). Tracts were used for measuring density. For measuring country food harvests, the finest resolution achieved was nine populations of merged tracts sharing common zip codes or community of residence. Each population was named according to general location, including Central Fairbanks (Tracts Fai01 to Fai05, 16,788 people), Southwest Fairbanks (Tracts Fai06 to Fai10, 17,574 people), and the North Pole Area (Tracts Fai14 to Fai16, 16,295 people). The remaining populations were single tracts, including Fort Wainwright (Tract Fai11, 7,381 people), Northeast Fairbanks (Tract Fai12, 4,894 people), Northwest Fairbanks (Tract Fai13, 5,127 people), Salcha-Harding (Tract Fai17, 1,128 people), Eielson Airforce Base (Tract Fai18, 5,400 people), and North Fairbanks (Tract Fai19, 8,253 people).

The Matanuska-Susitna Borough (59,322 people) was divided by the federal census into 28 census designated places (CDPs), census units which provided finer resolution than census tracts. The CDPs had an average size of 1,936 people, with a range of 27 people (Petersville CDP) to 7,049 people (Knik-Fairview CDP). CDPs were used for measuring density. For measuring country food harvests with harvest ticket/permit records, the finest resolution achieved was 14 populations, representing CDPs sharing common ZIP codes or community of residence (places in the ADF&G databases). Each population was named after its principal place, as shown in Fig. 11.

The Kenai Peninsula Borough (49,691 people) was divided by the federal census into 35 CDPs, census units which provided finer resolution than census tracts. The CDPs had an average size of 1,373 people, with a range of 18 people (Sunrise CDP) to 6,942 people (Kenai CDP). CDPs were used for measuring density. For measuring country food harvests with harvest ticket/permit records, the finest resolution achieved was 19 populations, representing CDPs sharing common ZIP codes or community of residence (places in the ADF&G databases). Each population was named after its principal place, as shown in Fig. 11.

The City and Borough of Juneau (30,711 people) was divided by the federal census into six census tracts with an average size of 5,118 people and a range of 3,644 to 7,445 people. The Ketchikan Gateway Borough was divided by the federal census into four census tracts, with an average size of 3,518 people and a range of 2,337 to 4,898 people. Tracts were used for measuring density. For measuring country food harvests with harvest ticket/permit records, the finest resolution achieved was to treat Juneau and Ketchikan as single entities.

For the areas listed in Fig. 11, the CPDB provided harvest estimates for certain *communities*, including Fritz Creek, Homer, Hope, Kenai, Nanwalek, North Fork Road, Parks Highway South, Port Graham, Saxman, Seldovia, Vosnesenka, and Talkeetna. As discussed above, if data exist, units like these can be treated as case populations in analysis. In our best analysis, Saxman and the Ketchikan community were treated as distinct cases (an example of co-resident populations). For the Kenai area, separate

discriminant analysis runs were conducted to assess outcomes using different sets of case populations and data sources, as discussed in Appendix B. A central issue was which data sources provided the best estimates of country food harvests for Kenai Peninsula populations. Our best analysis used an average of harvest estimates for case populations with dual data sources, as discussed in Appendix B.

In discriminant analysis, we used the populations listed in the first column of Fig. 11 as cases. This was a statistical choice. It was done to analyze case populations whose values on variables were independent of other cases. Such a selection criterion for case populations (independent measures) helps to minimize potential bias introduced by the statistical interaction of non-independent cases. As stated above, it is possible that stakeholders might request separate assessments for components of merged tracts or CDPs. In this event, values like those listed for component tracts or CDPs (the second column in Fig. 11) could be used in an assessment of a particular case. Whether such disaggregation would result in a different classification for a case would depend on the values of key variables. As the values of component tracts/CDPs are in general similar to values of merged tracts/CDPs in Fig. 11, it is unlikely that classifications of individually-assessed components would be changed.

Identifying Rural and Non-Rural Boundaries

A second aggregation/disaggregation step occurs after case populations are categorized as "rural" or "non-rural." Using a mapping procedure, individually-classified case populations are geographically combined into contiguous rural or non-rural areas. The general rule for aggregation into final groupings is the following: (1) case populations that are classified "rural" are grouped, and (2) case populations that are classified "non-rural" are grouped. Depending upon their geographic locations, case populations may be aggregated into final rural or non-rural groupings that are larger than the initial case populations. The aggregated areas may be named in regulation and shown as areas on a map.

This aggregation/disaggregation step results in the potential identification of larger rural and non-rural groupings, based on the consolidation of individual cases. The consolidation step may be used for simplifying descriptions of classification outcomes. For example, if all case populations in the Anchorage area were found qualify as "non-rural" populations, the outcome might be described simply in regulation as, "residents of the Anchorage Borough are 'non-rural' for subsistence management." Even though the findings were based on an assessment of disaggregated populations, each individually-assessed case population would not need to be listed in regulation.

This aggregation step has been common in federal and State procedures. In some cases, individual communities are classified and named in regulation. For example, *Adak* and *Valdez* were individually named as "non-rural" in federal regulations. But more commonly, classifications have been made for an area defined to include a set of communities. For example, the *Wasilla area*, *including Palmer, Wasilla, Sutton, Big*

Lake, Houston, and Bodenberg Butte was named a non-rural area in federal regulations. Rural populations in federal regulations include *all Alaskans residing in areas not named as non-rural areas*.

It is possible that the second aggregation step may reveal a relatively complex mosaic of populations in some areas of Alaska. That is, rural populations and non-rural populations may be found in close proximity. This would not be an unexpected outcome, especially in urban-rural fringe areas. If the mosaic is due to real and meaningful distinctions between populations, it is reasonable to retain them. The second aggregation step may enable boundaries of populations to be more precisely defined with additional information, such as input from stakeholders during a public process.

It is also possible that the second aggregation step may reveal that some case populations with tentative (uncertain) classifications lie on the fringe of a larger area with a different classification. Or, some case populations with tentative classifications may appear as geographic isolates, embedded within a larger area with a different classification. Such mosaic patterns may represent borderline or ambiguous case populations. If this is the situation, one may look to see if the borderline cases may represent variant extensions of a neighboring rural or non-rural pattern. The additional information about the geographic patterning of cases may provide a reason for additional assessment of tentative classifications. Using ancillary information, cases with tentative classifications on a fringe might be assessed to be part of the larger neighboring population. Tentative cases that appear to be geographic isolates also might be assessed to be part of the larger population. If so, this reassessment may be used as a basis for combining case populations and simplifying a mosaic. If the simplified map of areas has not distorted real population distinctions, refinement of boundaries should not raise significant public objections.

Work commuting patterns might be used as one variable for assessing if a fringe area is an extension of a rural or non-rural pattern. Commuting information in the federal census might be one basis for linking fringe cases or geographic isolates. The 1990 federal census provides travel time to work (< 5 minutes, 5 to 9 minutes, 10 to 14 minutes, etc.) for workers 16 years and over living in a census designated place. Travel time provides a general picture of the extent of daily travel by workers, but not with respect to destination.

The Economic Research Service (ERS) of the U.S. Department of Agriculture has developed a more detailed classification scheme to identify commuting patterns, referred to as the Rural-Urban Commuting Area Codes (RUCA). The system classified 1990 federal census tracts based on the percentage of tract residents finding work within or outside the tract, by type of origin and destination place. See Appendix C for a listing and description of the codes. In general, the code identifies the percentage of workers in a specific tract who are working outside their home tract and the type of place to which they are commuting, e.g., neighboring rural areas, towns (small, large), or metropolitan areas. Revisions of the RUCAs based on the federal 2000 census will be available in

2003. This information may be useful for identifying fringe populations that are extensions of an urban or rural area.

The board may find other information to link areas in addition to these. In clarifying boundaries at this assessment step, a board should be careful weighing the economic patterns of a segment of a case population (such as a measure like work commutes) with patterns established by other segments of a case population (such as extensive land uses).

Finally, it must be stated that the identification of areas open to fishing and hunting for subsistence represents a step separate from the identification of rural and non-rural populations. Our analysis defines populations based on residency (a geographic area or community in which people live). The places where rural residents fish and hunt commonly lie outside the boundaries of their places of residency. Determining fishing and hunting areas is another procedure, using information on customary and traditional use areas and the locations of wild fish stocks and wildlife populations.

Co-Resident Communities

Aggregation/disaggregation decisions may be affected by *co-residence,* a demographic phenomenon occasionally found in Alaska. *Co-residence* means "residence together" (Oxford English Dictionary 2nd Edition, v. III, p. 931, Clarendon Press, Oxford, J.A. Simpson and E.S.C. Weiner, eds.). *Co-resident communities (*or *co-resident populations)* may be defined as distinguishable communities (or populations) residing in the same geographic area. Old order Anabaptists (such as the Amish and Old Order Mennonites) and the greater Pennsylvania population provide clear examples of co-resident populations, as discussed in previous sections. The old order groups are organized into communities with distinctive rural economies. Yet they are not geographically distinct, being interspersed among dominant, mainstream populations. As stated above, a *community* is a named human population forming a distinct segment of society by virtue of a common government, common interests, a pattern of sharing, participation, fellowship, or other factors (American Heritage Dictionary of the English Language, 4th Edition 2000: 374). The old order groups qualify as communities because of their common faith-based practices, including distinct rural land uses. In practical terms, Anabaptist communities are identifiable by membership lists of people who reside in a local area.

The concept of co-resident communities is germane for understanding land use patterns in certain parts of Alaska. There are areas in Alaska supporting co-resident communities with distinctly different patterns of land use. That is, co-resident communities share a "place" of residence, but may use the *commons* (surrounding public lands and waters) in substantially different ways. In some cases, one community's land use pattern may display rural characteristics, while the other community's land use pattern may display non-rural characteristics. In these instances, it is not the common area that is "rural" or "non-rural" – the commons in fact supports each type of land use. It is the community-

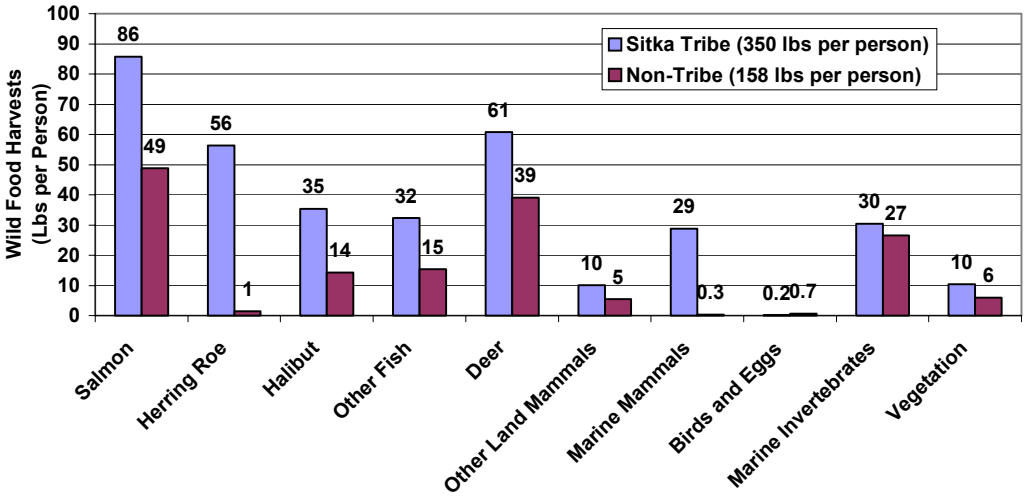
land use pattern that is "rural" or "non-rural." In these cases, a single geographic area has co-resident rural and non-rural communities.

As previously noted, one Alaska example of co-resident rural and non-rural communities is Saxman and the greater Ketchikan community. A relatively complex mosaic of governmental jurisdictions and federal rural classifications occur near downtown Ketchikan. Traveling southeast by road from downtown Ketchikan, one passes through Ketchikan City ("non-rural"), then through the unincorporated Ketchikan Gateway Borough ("non-rural"), then (about three miles from downtown) through Saxman City ("rural"), and then again through the unincorporated Ketchikan Gateway Borough ("non-rural"). There are residential neighborhoods all along the way. Currently, Saxman is a relatively small community (431 people, one-square-mile area) embedded in the greater Ketchikan community. While once geographically removed, the Ketchikan community has grown to surround Saxman. Yet, Saxman has persisted as a distinct, rural community surrounded by a non-rural community. Saxman's rural status has been supported by the community's continued distinctive relationship to the commons, rather than the geographic location of its houses (surrounded by the greater Ketchikan community) or its accessibility to employment and stores (which is the same as the greater Ketchikan community). The level of production of country foods by Saxman (211 lbs per capita in 1999) resembles a rural adaptation. The land use pattern appears to be distinct from the pattern of the greater Ketchikan community (31 lbs per capita) within the same commons. (As a caveat, comparable complete harvest surveys have not as yet been administered in the greater Ketchikan community. Such a survey of Ketchikan households would allow a more direct comparison with Saxman's harvest pattern.)

Another example of co-resident communities in Alaska is found in the City and Borough of Sitka. This area is home to the local Sitka tribe and the greater Sitka community. Tribal land near the heart of Sitka contains the tribal offices and tribal services. But unlike the Saxman case, the houses of Sitka tribal members are dispersed throughout the City and Borough, rather than concentrated on tribal holdings. The uses of the surrounding commons by each community for food production are distinctive, as shown by per capita harvests documented by household surveys administered by the State Division of Subsistence in 1996 (Fig. 12). For instance, Sitka Sound supports the largest non-commercial herring roe fishery in Alaska. The local Sitka tribe produces almost all of the non-commercial herring roe harvested from the fishery – 117,826 lbs of herring roe in 1996 (equivalent to 56 lbs per tribal member). Although the local Sitka tribe and the greater Sitka community share the commons for herring, the roe fishery is principally an endeavor of the tribal community (Schroeder and Kookesh 1990). A significant portion of the non-commercial herring roe harvest is distributed in the southeast region along traditional sharing networks. The local harbor seal fishery also is principally an endeavor of the tribal community, as shown in Fig. 12. A portion of the local tribe's annual non-commercial country food harvest goes to a tribal food program for redistribution to the elderly in Sitka and for use at tribal ceremonies. Overall, the Sitka tribal community produced twice as much country foods on a per capita basis as the non-tribal population – 350 lbs compared with 158 lbs (the mean for the Sitka area population in aggregate was 205 lbs). The local Sitka tribal community is identifiable as

those persons on tribal roles and living in the City and Borough of Sitka. Thus, in addition to geography (residency in a definable area), the community is defined by a governmental jurisdiction (a tribal role). Unlike the Saxman and greater Ketchikan example, both the greater Sitka community and local Sitka tribal community exhibit rural characteristics, according to federal and State assessments. It appears to represent an example of co-resident rural communities.

Fig. 12. Wild Food Harvests (Lbs per Capita) in Sitka, by Sitka Tribe and Non-Tribe Populations, 1996



Co-resident communities may develop in rural/urban fringe areas, which commonly contain a mosaic of land use patterns. Co-resident communities also may develop when population growth by in-migration envelops pre-existing populations. The pre-existing populations may continue a traditional land use pattern, while the in-migrants do not. In this case, the communities reside in the same area, with distinguishable land uses. A *rural isolate* is a community with rural characteristics in a predominately urban area, distinguishable by factors of history, culture, and land uses. A *non-rural isolate* is a community with non-rural characteristics in a predominately rural area. One example of a non-rural isolate was the airforce station at Galena. The Alaska Joint Board classified the airforce station as "non-rural" and the greater Galena community as "rural," making the airforce community a non-rural isolate with a larger rural area.

Co-residency presents additional choices in aggregation and disaggregation. If distinctive co-resident communities are found to exist, there are at least three choices. Each community might be analyzed separately for separate classifications (disaggregated). The co-resident communities might be analyzed as a single population for a single classification (aggregated). Or, the co-resident communities might be analyzed as separate populations, but with the entire area given a single classification based on the assessment of one or the other co-resident community. To illustrate these possibilities in our analysis, we have treated Saxman as a distinct community from the greater Ketchikan community and we have treated the local Sitka Tribe as a distinct

community from the greater Sitka community. This is possible because good information exists for each community. Without this type of information, the co-resident communities likely would be aggregated. The disaggregation allows for testing of the rural or non-rural characteristics of each co-resident community. As shown below, in the Saxman-Ketchikan pair, the methodologies classify Saxman community as "rural" and the greater Ketchikan community as "non-rural." In the Sitka-Sitka Tribe pair, the methodologies classify the Sitka community as "rural" and the Sitka Tribe community as "rural."

As discussed in the Focus Group section, co-resident communities with different land use patterns may exist in the Kenai-Soldotna area. Additional research on co-resident communities in that area might examine questions raised by the Kenai focus groups, where the perceptions of rural/non-rural classifications of the Kenai area diverged between the two focus groups. Research documenting land use patterns for the local Kenaitze tribe and the greater Kenai-Soldotna community would provide information that could be used to examine co-residency as a possible basis for the discrepant assessments.